

Docket No.: 99-885

COMPLETE LISTING OF CLAIMS
IN ASCENDING ORDER WITH STATUS INDICATORS

THIS LISTING OF CLAIMS WILL REPLACE ALL PRIOR VERSIONS
AND LISTING OF CLAIMS IN THE APPLICATION.

1. (Currently Amended) A method for estimating end-to-end quality of service parameters for an Internet Protocol ("IP") communications network, wherein the end-to-end quality of service parameters are selected from end-to-end packet loss, end-to-end packet delay and end-to-end packet delay jitter, and wherein the IP communications network includes routers connected by links and gateways between to a Public Switched Telephone Network ("PSTN") ~~and the routers~~, the method using estimates of offered traffic for each service from each source carried to each gateway of the IP communications network, comprising the steps of:

~~determining a possible number N of sources;~~

estimating, from the offered traffic to each gateway, blocked traffic and carried traffic ~~from~~ at each gateway;

estimating a load carried traffic for each network link using a network routing algorithm and based on the carried traffic;

calculating ~~a plurality of loss probability probabilities~~ for each network link using the load carried for the network link and by varying a the number of active sources N for each calculation; and

estimating an end-to-end packet loss probability by using summing the plurality of loss probabilities of each network link from the calculating step.

2. (Currently amended) The method of claim 1, wherein the ~~plurality of~~ loss probabilities ~~are~~ is calculated over all possible numbers of active sources values of N, and wherein the step of estimating an end-to-end packet loss probability sums the plurality of loss probabilities over all possible numbers of active sources values of N.

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3. (Currently Amended) The method of claim 1, further comprising: ~~the step of estimating the a single link packet delay for each network link distribution~~ after the step of estimating the load carried traffic for each network link.
4. (Currently Amended) The method of claim 3, further comprising ~~the step of estimating the an end-to-end packet delay distribution~~ using the packet delays for each network link.
5. (Currently Amended) The method of claim 1, further comprising ~~the step of estimating the an end-to-end packet delay jitter~~.
6. (Currently Amended) The method of claim 1, wherein the offered traffic for each service has deterministic and non-deterministic attributes for packet length and inter-arrival distribution.
7. (Currently Amended) The method of claim 1, wherein a Kaufman algorithm is used in ~~the step of estimating blocked traffic and carried traffic~~.
8. (Cancelled)
9. (Currently amended) The method of claim 1, wherein the estimates of loads carried offered traffic for each network link are in Erlangs.
10. (Currently Amended) A method for estimating end-to-end quality of service parameters for an Internet Protocol ("IP") communications network, wherein the end-to-end quality of service parameters are selected from end-to-end packet loss, end-to-end packet delay and end-to-end packet delay jitter, and wherein the IP communications network includes routers connected by links and gateways between to a Public Switched Telephone Network ("PSTN") ~~and the interconnected routers~~, the method using estimates of offered traffic having deterministic and non-deterministic attributes for packet length and inter-arrival distribution for each service

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from each of a varying number of active sources carried to each gateway of the IP communications network, comprising the steps of:

- ~~determining a possibly number N of sources;~~
- estimating, from the offered traffic to each gateway, a blocked traffic and a carried traffic from each gateway;
- estimating a load ~~carried traffic~~ for each network link using a network routing algorithm;
- ~~estimating a single link packet loss probability for each link;~~
- calculating a ~~plurality of~~ loss probability probabilities for each network link by using the estimated load carried for the network link and a varying the number of active sources N for each calculation;
- estimating an end-to-end packet loss probability by using summing the plurality of loss probabilities for each network link;
- estimating ~~the a single link packet delay distribution~~ for each link based on the loss probability of the network link;
- estimating ~~the an end-to-end packet delay distribution~~ based on the packet delays for each link; and
- estimating ~~the an end-to-end packet delay jitter based on the end-to-end packet delay.~~

11. (Currently amended) The method of claim 10, wherein the ~~plurality of~~ loss probabilities for each network link are ~~is~~ calculated over all possible numbers of active sources values of N, and wherein the step of estimating an end-to-end packet loss probability sums the ~~plurality of~~ loss probabilities for each network link over all possible numbers of active sources values of N.

12. (Currently Amended) A method for estimating end-to-end quality of service parameters for an Internet Protocol ("IP") communications network, wherein the end-to-end quality of service parameters are selected from end-to-end packet loss, end-to-end packet delay and end-to-end packet delay jitter, and wherein the IP communications network includes routers connected by links and gateways between to a Public Switched Telephone Network ("PSTN") ~~and the routers,~~ the method, using

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estimates of offered traffic for each service from each source carried to each gateway of the IP communications network, comprising the steps of:

- determining a possible number N of sources;
- estimating, from the offered traffic to each gateway, a blocked traffic and a carried traffic from each gateway;
- estimating a load carried traffic for each network link using a network routing algorithm;
- calculating at least one quality of service parameter for each network link using the estimated load carried for the network link and by varying the number N for each calculation; and
- estimating at least one end-to-end quality of service parameter by summing the quality of service parameters characteristics for the network links.

13. (Currently amended) The method of claim 12, wherein the at least one quality of service parameter characteristic for the network link is selected from the group consisting of single link packet loss probability and single link packet delay distribution.

14. (Currently amended) The method of claim 12, wherein the at least one end-to-end quality of service parameter characteristic is selected from the group consisting of end-to-end packet loss probability, end-to-end packet delay distribution, and end-to-end packet delay jitter.

15. (Currently amended) The method of claim 14, wherein the quality of service parameter characteristic for the network link is selected from the group consisting of single link packet loss probability and single link packet delay distribution.

16. (Original) The method of claim 12, wherein the estimates of offered traffic are in Erlangs.

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17. (Currently Amended) A system for estimating end-to-end quality of service parameters for an Internet Protocol ("IP") communications network, wherein the end-to-end quality of service parameters are selected from end-to-end packet loss, end-to-end packet delay and end-to-end packet delay jitter, and wherein the IP communications network includes routers connected by links and gateways between to a Public Switched Telephone Network ("PSTN") ~~and the routers~~, the system, ~~using estimates in Erlangs, of offered~~ carrying traffic for one or more each service types from one or more sources each source carried to each gateway of the Internet Protocol communications network, comprising:

- a database comprising parameters for each gateway, the parameters identifying type of service and characteristics of each service;

- a memory comprising an end-to-end quality of service program; and

- a processor utilizing the end-to-end quality of service program to

- ~~determine a possible number N of sources;~~

- ~~estimate, from offered traffic to each gateway, a blocked traffic and a carried traffic at from each gateway;~~

- ~~estimate a load carried traffic for each network link using a network routing algorithm and based on the carried traffic at each gateway;~~

- ~~calculate a plurality of loss probability probabilities for each network link by using the corresponding load carried for the network link and a varying the number of active sources N for each calculation; and~~

- ~~estimate an end-to-end packet loss probability by using summing the plurality of loss probabilities of each network link.~~

18. (New) A method, comprising:

- determining a load carried by each link in a network, the network including multiple links connecting multiple routers;

- computing a QoS parameter value for each link based on the load carried by said link and taking into account changes in a number of active sources feeding the network;

- computing an end-to-end QoS parameter value using the QoS parameter values for each link.

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19. (New) The method of claim 18, wherein the load carried by each link in the network includes traffic of one or more service types, and wherein the one or more service types include one or more voice over IP types.
20. (New) The method of claim 18, wherein the QoS parameter for the network is one of packet loss, packet delay and packet delay jitter.
21. (New) The method of claim 18, further comprising:
 estimating an amount of traffic carried at a gateway to the network;
 and wherein determining the load carried by each link in a network is based on the estimated amount of traffic carried at the gateway.